IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Previously Presented): A CVD single crystal diamond material having a single substitutional nitrogen concentration of more than 3 x 10^{15} atoms/cm^3 and less than 5 x 10^{17} atoms/cm^3 as measured by electron paramagnetic resonance (EPR), which diamond material shows at least one of the following characteristics, when measured at room temperature (nominally 20°C):

i) a high optical homogeneity, with the transmitted wavefront differing from the expected geometrical wavefront during transmission through diamond of a specified thickness of at least 0.5 mm, processed to an appropriate flatness and measured over a specified area of at least 1.3 mm × 1.3 mm, by less than 2 fringes, where 1 fringe corresponds to a difference in optical path length equal to 1/2 of the measurement wavelength of 633 nm;

ii) a low optical birefringence, indicative of low strain, such that in a sample of a specified thickness of at least 0.5 mm and measured in a manner described herein over a specified area of at least 1.3 mm × 1.3 mm, the modulus of the sine of the phase shift, $|\sin \delta|$, for at least 98% of the analysed area of the sample remains in first order (δ does not exceed $\pi/2$) and the $|\sin \delta|$ does not exceed 0.9;

iii) a low optical birefringence, indicative of low strain, such that in a sample of a specified thickness of at least 0.5 mm and measured in a manner described herein over a specified area of at least 1.3 mm × 1.3 mm, for 100% of the area analysed, the sample remains in first order (δ does not exceed $\pi/2$), and the maximum value of $\Delta n_{[average]}$, the average value of the difference between the

refractive index for light polarised parallel to the slow and fast axes averaged over the sample thickness, does not exceed 1.5×10^{-4};

iv) an effective refractive index in a sample of a specified thickness of at least 0.5 mm, measured in a manner described herein over a specified area of at least 1.3 mm × 1.3 mm, which has a value of 2.3964 to within an accuracy of +/- 0.002;

v) a combination of optical properties such that when the diamond material is prepared as a diamond plate in the form of an etalon of a specified thickness of at least 0.5 mm and measured using a laser beam with a wavelength near 1.55 μm and a nominal diameter of 1.2 mm over a specified area of at least 1.3 mm × 1.3 mm, it exhibits a free spectral range (FSR) which, when measured at different positions over the plate, varies by less than 5×10^{-3} cm^{-1};

vi) a combination of optical properties such that when the diamond material is prepared as a diamond plate in the form of a Fabry-Perot solid etalon of a specified thickness of at least 0.5 mm, and measured using a laser beam with a wavelength near 1.55 μm and a nominal diameter of 1.2 mm over a specified area of at least 1.3 mm × 1.3 mm, and which has no coatings applied to the optically prepared surfaces, it exhibits when measured at different positions over the plate a contrast ratio exceeding 1.5;

vii) a combination of optical properties such that when the diamond material is prepared as a diamond plate in the form of an etalon of a specified thickness of at least 0.5 mm, and measured using a laser beam with a wavelength near 1.55 μm and a diameter of 1.2 mm over a specified area of at least 1.3 mm × 1.3 mm, it exhibits an insertion loss not exceeding 3 dB;

viii) a variation in refractive index over a volume of interest, said volume comprising a layer of a specified thickness of at least 0.5 mm, measured in a manner described herein over a specified area of at least 1.3 mm × 1.3 mm, which is less than 0.002.

Claim 2 (Original): A CVD single crystal diamond material according to claim 1, wherein the transmitted wavefront differs from the expected geometrical wavefront by less than 0.5 fringes.

Claim 3 (Original): A CVD single crystal diamond material according to claim 2, wherein the transmitted wavefront differs from the expected geometrical wavefront by less than 0.2 fringes.

Claim 4 (Previously Presented): A CVD single crystal diamond material according to claim 1, wherein the modulus of the sine of the phase shift, $|\sin \delta|$, for at least 98% of the analysed area remains in first order and does not exceed 0.4.

Claim 5 (Previously Presented): A CVD single crystal diamond material according to claim 1, wherein the modulus of the sine of the phase shift, $|\sin \delta|$, for 100% of the analysed area remains in first order and where $\Delta n_{[average]}$ does not exceed 5×10^{-5}.

Claim 6 (Previously Presented): A CVD single crystal diamond material according to claim 1, which has a value of effective refractive index of 2.3964 to within an accuracy of ± 0.001.

Claim 7 (Previously Presented): A CVD single crystal diamond material according to claim 6, which has a value of effective refractive index of 2.39695 to within an accuracy of ± 0.0005.

Claim 8 (Previously Presented): A CVD single crystal diamond material according to claim 1, which exhibits a free spectral range (FSR) which, when measured at different positions over the material, varies by less than 2×10^{-3} cm^{-1}.

Claim 9 (Original): A CVD single crystal diamond material according to claim 8, wherein the free spectral range varies by less than 5×10^{-4} cm^{-1}.

Claim 10 (Previously Presented): A CVD single crystal diamond material according to claim 1, which has a variation in refractive index over the volume defined by the specified thickness and the specified area, measured in a manner described herein, which is less than 0.001.

Claim 11 (Original): A CVD single crystal diamond material according to claim 10, wherein the variation in refractive index is less than 0.0005.

Claim 12 (Previously Presented): A CVD single crystal diamond material according to claim 1, which when prepared as a diamond plate in the form of a Fabry-Perot solid etalon exhibits when measured over different positions over the plate of specified thickness and area a contrast ratio exceeding 1.7.

Claim 13 (Original): A CVD single crystal diamond material according to claim 12, wherein the contrast ratio exceeds 1.8.

Claim 14 (Previously Presented): A CVD single crystal diamond material according to claim 1, which when prepared as a diamond plate in the form of a Fabry-Perot solid etalon exhibits, when measured using a laser beam with a wavelength near 1.55 μm and a diameter of 1.2 mm over different positions over the plate of specified thickness and area, an insertion loss not exceeding 1 dB.

Claim 15 (Original): A CVD single crystal diamond material according to claim 14, wherein the insertion loss does not exceed 0.5 dB.

Claim 16 (Previously Presented): A CVD single crystal diamond material having a single substitutional nitrogen concentration of more than 3×10^{15} atoms/cm^3 and less than 5×10^{17} atoms/cm^3 as measured by electron paramagnetic resonance (EPR), which diamond material shows at least one of the following characteristics, when measured at room temperature (nominally 20°C):

i) a low and uniform optical scatter such that for a sample of a specified thickness of at least 0.4 mm the forward scatter at 1.064 μm, measured in a manner described herein over a specified area of at least 1.3 mm × 1.3 mm, integrated over a solid angle from 3.5° to 87.5° from the transmitted beam, is less than 0.4%;

ii) a low and uniform optical absorption such that a sample of a specified thickness of at least 0.5 mm has an optical absorption coefficient at a wavelength of 1.06 μm of less than 0.09 cm^{-1};

iii) a low and uniform optical absorption such that a sample of a specified thickness of at least 0.5 mm has an optical absorption coefficient at a wavelength of 10.6 μm of less than 0.04 cm^{-1}.

Claim 17 (Original): A CVD single crystal diamond material according to claim 16, wherein the forward scatter at a wavelength of 1.064 μm measured in sample of the specified thickness and area, integrated over a solid angle from 3.5° to 87.5° from the transmitted beam, is less than 0.2%.

Claim 18 (Original): A CVD single crystal diamond material according to claim 17, which exhibits a forward scatter at 1.064 μm of less than 0.1%.

Claim 19 (Previously Presented): A CVD single crystal diamond material according to claim 16, wherein the optical absorption coefficient at 1.06 μm is less than 0.05 cm^{-1}.

Claim 20 (Original): A CVD single crystal diamond material according to claim 19, wherein the optical absorption coefficient at 1.06 μm is less than 0.02 cm^{-1}.

Claim 21 (Previously Presented): A CVD single crystal diamond material according to claim 16, wherein the optical absorption coefficient at 10.6 μm is less than 0.03 cm^{-1}.

Claim 22 (Original): A CVD single crystal diamond material according to claim 21, wherein the optical absorption coefficient at 10.6 μm is less than 0.027 cm^{-1}.

Claim 23 (Previously Presented): A CVD single crystal diamond material having a single substitutional nitrogen concentration of more than 3 x 10^{15} atoms/cm^3 and less than 5 x 10^{17} atoms/cm^3 as measured by electron paramagnetic resonance (EPR), which diamond material shows at least one of the following characteristics, when measured at room temperature (nominally 20°C):

i) an ability to be processed to show a high surface polish with an R_a (arithmetic mean of the absolute deviation from the mean line through the profile) measured over a specified area of at least 1.3 mm × 1.3 mm less than 2 nm;

ii) an ability to be processed to show a high flatness, with a flatness measured using 633 nm radiation and measured over a specified area of at least 1.3 mm × 1.3 mm which is better than 10 fringes;

iii) an ability to be processed to show a high parallelism, with a parallelism measured over a specified area of at least 1.3 mm × 1.3 mm which is better than 1 arc minute.

Claim 24 (Original): A CVD single crystal diamond material according to claim 23, which can be processed to show a surface polish with an R_a less than 1 nm.

Claim 25 (Original): A CVD single crystal diamond material according to claim 24, which can be processed to show a surface polish with an R_a less than 0.6 nm.

Claim 26 (Previously Presented): A CVD single crystal diamond material according to claim 23, which can be processed to show a flatness better than 1 fringe.

Claim 27 (Original): A CVD single crystal diamond material according to claim 26, which can be processed to show a flatness better than 0.3 fringes.

Claim 28 (Previously Presented): A CVD single crystal diamond material according to claim 23, which can be processed to show a parallelism better than ± 30 arc seconds.

Claim 29 (Original): A CVD single crystal diamond material according to claim 28, which can be processed to show a parallelism better than ± 15 arc seconds.

Claim 30 (Previously Presented): A CVD single crystal diamond material according to claim 23, which shows at least two of the given characteristics.

Claim 31 (Original): A CVD single crystal diamond material according to any one of claims 1 to 15, which shows at least three of the given characteristics.

Claim 32 (Original): A CVD single crystal diamond material according to claim 31, which shows at least four of the given characteristics.

Claim 33 (Original): A CVD single crystal diamond material according to any one of claims 16 to 22, which shows all three of the given characteristics.

Claim 34 (Original): A CVD single crystal diamond material according to any one of claims 23 to 29, which shows all three of the given characteristics.

Claim 35 (Previously Presented): A CVD single crystal diamond material according to claim 1, wherein the specified area of the sample in each of the satisfied characteristics, if given, is at least 2.5 × 2.5 mm.

Claim 36 (Original): A CVD single crystal diamond material according to claim 35, wherein the specified area of the sample in each of the satisfied characteristics, if given, is at least 4 × 4 mm.

Claim 37 (Previously Presented): A CVD single crystal diamond material according to claim 1, wherein the specified thickness of the sample in each of the satisfied characteristics, if given, is at least 0.8 mm.

Claim 38 (Original): A CVD single crystal diamond material according to claim 37, wherein the specified thickness of the sample in each of the satisfied characteristics, if given, is at least 1.2 mm.

Claims 39-40 (Canceled).

Claim 41 (Previously Presented): A CVD single crystal diamond material according to claim 1, having a Raman normalised luminescence intensity of the 575 nm and 637 nm peaks which is less than 40.

Claim 42 (Original): A CVD single crystal diamond material according to claim 41, having a Raman normalised luminescence intensity of the 575 nm and 637 nm peaks which is less than 10.

Claim 43 (Original): A CVD single crystal diamond material according to claim 42, having a Raman normalised luminescence intensity of the 575 nm and 637 nm peaks which is less than 3.

Claim 44 (Previously Presented): A CVD single crystal diamond material according to claim 1, with a thermal conductivity measured at 20°C which is greater than 1800 $Wm^{-1}K^{-1}$.

Claim 45 (Original): A CVD single crystal diamond material according to claim 44, wherein the thermal conductivity measured at 20°C is greater than 2300 $Wm^{-1}K^{-1}$.

Claim 46 (Previously Presented): A CVD single crystal diamond material according to claim 1, in the form of a plate having opposed major faces, which is prepared for use with an average dislocation direction in the plate more than 30° from normal to the major faces.

Claim 47 (Previously Presented): A CVD single crystal diamond material according claim 1, which was annealed as part of its preparation.

Claim 48 (Previously Presented): A CVD single crystal diamond material according claim 1, which was annealed subsequent to its preparation.

Claim 49 (Previously Presented): A CVD single crystal diamond material according to claim 1, which is formed into a mechanical layer or an optical layer or a polished gemstone.

Claim 50 (Original): A CVD single crystal diamond material according to claim 49, which is formed into a polished gemstone.

Claim 51 (Previously Presented): A CVD single crystal diamond material according to claim 1, which exceeds at least one of the following dimensions:

a) a lateral dimension of 1 mm,

b) a second orthogonal lateral dimension of 1 mm,

c) a thickness of 0.1 mm.

Claim 52 (Original): A CVD single crystal diamond material according to claim 51, wherein a lateral dimension exceeds 5 mm.

Claim 53 (Original): A CVD single crystal diamond material according to claim 51 or claim 52, wherein the thickness dimension exceeds 0.8 mm.

Claim 54 (Previously Presented): A CVD single crystal diamond material according to claim 51, which exceeds at least two of the dimensions a to c.

Claim 55 (Original): A CVD single crystal diamond material according to claim 54, which exceeds all three of the dimensions a to c.

Claims 56-57 (Canceled).

Claim 58 (Previously Presented): A CVD single crystal diamond material according to claim 1, which contains less than 2×10^{17} atoms/cm^3 N in single substitutional form as measured by EPR.

Claim 59 (Canceled).

Claim 60 (Previously Presented): A CVD single crystal diamond material according to claim 1, which contains more than 1×10^{16} atoms/cm^3 N in single substitutional form as measured by EPR.

Claim 61 (Original): A CVD single crystal diamond material according to claim 60, which contains more than 5×10^{16} atoms/cm^3 N in single substitutional form as measured by EPR.

Claim 62 (Withdrawn-Currently Amended): A method of producing [[a]] the CVD diamond material ~~suitable for optical applications includes the steps of~~ according to claim 1, which method comprises providing a substrate substantially free of crystal defects, providing a source gas, dissociating the source gas to produce a synthesis atmosphere which contains 300 ppb to 5 ppm nitrogen, calculated as molecular nitrogen, and allowing homoepitaxial diamond growth on the surface which is substantially free of crystal defects.

Claim 63 (Withdrawn): A method according to claim 62, wherein the synthesis atmosphere contains more than 500 ppb nitrogen, calculated as molecular nitrogen.

Claim 64 (Withdrawn): A method according to claim 63, wherein the synthesis atmosphere contains more than 800 ppb nitrogen, calculated as molecular nitrogen.

Claim 65 (Withdrawn-Currently Amended): A method according to ~~any one of claims 62 to 64~~ claim 62, wherein the synthesis atmosphere contains no more than 2 ppm nitrogen, calculated as molecular nitrogen.

Claim 66 (Withdrawn): A method according to claim 65, wherein the synthesis atmosphere contains no more than 1.5 ppm nitrogen, calculated as molecular nitrogen.

Claim 67 (Withdrawn): A method according to claim 62, wherein the level of nitrogen is selected to be sufficient to prevent or reduce local strain generating defects whilst being low enough to prevent or reduce deleterious absorptions and crystal quality degradation.

Claim 68 (Withdrawn-Currently Amended): A method according to ~~any one of claims 62 to 67~~ claim 62, wherein the density of defects is such that surface etch features related to defects is below $5 \times 10^3/mm^2$.

Claim 69 (Withdrawn): A method according to claim 68, wherein the density of defects is such that surface etch features related to defects is below $10^2/mm^2$.

Claim 70 (Withdrawn-Currently Amended): A method according to ~~any one of claims 62 to 69~~ claim 62, wherein the surface of the diamond substrate on which CVD diamond growth occurs is the {100} surface.

Claim 71 (Withdrawn-Currently Amended): A method according to ~~any one of claims 62 to 70~~ claim 62, wherein the level of nitrogen is controlled with an error of less than 300 ppb (as a molecular fraction of the total gas volume) or 10% of the target value in the gas phase, whichever is the larger.

Claim 72 (Withdrawn): A method according to claim 71, wherein the level of nitrogen is controlled with an error of less than 100 ppb (as a molecular fraction of the total gas volume) or 3% of the target value in the gas phase, whichever is the larger.

Claim 73 (Withdrawn): A method according to claim 72, wherein the level of nitrogen is controlled with an error of less than 50 ppb (as a molecular fraction of the total gas volume) or 2% of the target value in the gas phase, whichever is the larger.

Claim 74 (Withdrawn-Currently Amended): A method according to ~~any one of claims 62 to 73~~ claim 62, wherein the properties of the CVD single crystal diamond material produced are further enhanced by annealing the diamond material.

Claim 75 (Canceled).

Claim 76 (Previously Presented): An etalon produced from a CVD single crystal diamond material according to claim 1.

Claim 77 (Original): An etalon according to claim 76, which is a Fabry-Perot etalon or a Gires-Tournois etalon.